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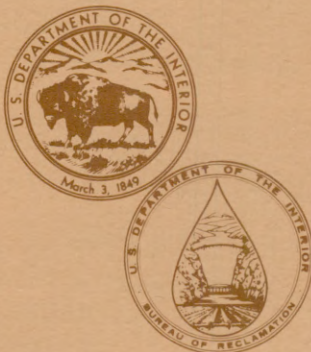
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REVIEW OF POWER OPERATION AND MAINTENANCE PROGRAM



REVIEW REPORT

Communication and Control

Central Snake Project
Grand Coulee Project
Columbia Basin Project

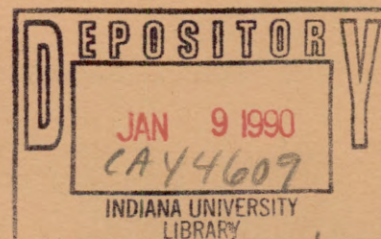
August 21 - 24, 1989

Pacific Northwest Region

Engineering Division
Denver Office

LS Bureau of Reclamation

UNITED STATES DEPARTMENT OF THE INTERIOR
Denver, Colorado



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August 1989



IN REPLY
REFER TO:

D-5210

United States Department of the Interior

BUREAU OF RECLAMATION

DENVER OFFICE

P O BOX 25007

BUILDING 67, DENVER FEDERAL CENTER
DENVER, COLORADO 80225-0007



SEP 13 1989

Review of Power Operation and Maintenance Program

Review Report

To: Chief, Engineering Division

From: Richard F. Gebhardt, Electronics Engineer

Subject: Review of Power Operation and Maintenance - Communications Features -
Pacific Northwest Region - August 21-24, 1989 (Review of Operation and
Maintenance)

GENERAL

1. Mr. Richard F. Gebhardt of the Facilities Engineering Branch, Engineering Division, Denver Office, and Mr. C. A. Bolin, Operations and Maintenance, Pacific Northwest Regional Office, comprised the communications review team. Offices visited during this review were: the Central Snake Project Office, the Grand Coulee Project Office, the Columbia Basin Project Office, and the Regional Office in Boise. Mr. Haydn Lee, Chief of the Engineering Division, Denver Office, accompanied the team on the visits to Grand Coulee, the Columbia Basin, and Anderson Ranch Dam and repeater site. Mr. Gebhardt presented an exit interview to Mr. Paul Rachetto, Assistant Regional Director for Administration and Acting Regional Director, at the Pacific Northwest Regional Office in Boise, Idaho, August 24, 1987. Also present were Mr. Lee, Mr. Bolin, and Mr. Terry Kent of Operations and Maintenance, Pacific Northwest Region. Mr. Rachetto thanked the team for its review.

2. Locations and personnel visited were:

On the Central Snake Project:

Project Office - Steve Jarsky, Chief of Power and Jim Nolan, Communications Technician (Mr. Jarsky and Mr. Nolan accompanied the team on the visit to the Shafer Butte Repeater Site and the Black Canyon Dam and Powerplant and Control Center visits on the Central Snake Project sites. Mr. Nolan alone conducted the team to the Anderson Ranch sites.) Mr. Nolan performed the fade margin tests at both the Shafer Butte and Anderson Ranch sites using equipment provided by Mr. Gebhardt.

Shafer Butte Repeater Site

Black Canyon Dam Control Center - Frank McBee, Chief, O&M Field Branch and Chuck Stenzel, Operations Foreman

Anderson Ranch Dam
Anderson Ranch Repeater (TV Hill)

On the Grand Coulee Project:

Project Office (Communications and Instrumentation Office in the left powerplant) - Loren Dotson, Communications and Instrumentation (C&I) Chief, was on leave. Mr. Lee Star conducted the team on a tour of project communication sites and performed the fade margin tests.
National Park Service communications vault
500 Switchyard building
Third Powerplant

On the Columbia Basin Project:

Dry Falls Dam - Ron Jeske, Hydrologic Technician
East West Bifurcation (conducted a tour of two remote control locations) - Henry Visker, Dry Falls Dam Superintendent
Ephrata Office - Francis Jensen, Chief of Irrigation
Wahatis Peak Repeater - Ron Jeske, Hydrologic Technician
Othello Office (conducted a tour of the Wahatis peak repeater and Othello sites) - Ken Phillips and Darrell Fuller of the East Columbia Basin Irrigation District accompanied the team.
Mr. Fuller performed the fade margin tests.

3. At each stop, the team checked for proper posting of current Radio Frequency Authorizations and the existence of a proper logbook containing all previous Reclamation forms 7-2200, TEST RESULTS, RADIO EQUIPMENT MAINTENANCE LOG. Antennas and feedlines were visually inspected, and then fade margin tests were accomplished by the respective technicians using calibrated attenuator equipment provided by Mr. Gebhardt. Mr. Gebhardt recorded the fade margin values.

Technicians and engineers were reminded of:

(a) The necessity and importance of posting a current Radio Frequency Assignment (RFA) at the site and having a log book with all maintenance records available. (Future releases of RI 254 will require that the log book at each site include all previous originals of Reclamation form 7-2200 - Test Results, Radio Equipment Maintenance Log, for each transmitter.)

(b) The requirement for an up-to-date system diagram. (Posting of a current system diagram at or near each involved site would prove helpful to stem operators and maintenance technicians.)

(c) The requirement to submit a corrected request for frequency assignment whenever any item on the RFA is changed or found to be incorrect (i.e. location, antenna type or orientation, output power, etc.).

(d) The fact that the RFA is associated with the frequency, location, and antenna characteristics, and not just the equipment.

CENTRAL SNAKE PROJECT OFFICE

4. The Central Snake Project radios are well maintained. Current RFA's and log books were maintained at all sites visited by the team.

5. Fade margin tests were performed at Shafer Butte Repeater on signals received from Black Canyon Powerplant, Anderson Ranch Control Repeater, Arrowrock Dam, Black Canyon Park, Boise Project Headquarters, Boise Diversion Dam, Cascade Dam, and Deadwood Dam. Snow Bank Repeater has not been installed. Signals were acceptable from all sites. Reception was marginal from Boise Diversion Dam.

6. The project's solution to an intermittent propagation problem (non-line-of-sight) on a 415.075 UHF link from Anderson Ranch Dam up to Anderson TV Hill repeater has proved to be an excellent one. They installed two back-to-back MAXRAD yagi antennas connected to a 30 inch length of coaxial cable as a passive reflector. The intermittent outage problem appears to have been effectively eliminated. Previously, daily outages were experienced up until about 10 am each day. Since the passive repeater has been installed about 3 years ago, no outages have been experienced. It should be cautioned that this type of passive repeater has only been proven effective over short distances such as are present on the Anderson Ranch to Anderson Ranch repeater link. (a distance of approximately 1 + 2 or 3 miles total.) The fade margin receiving from Anderson Ranch Control Repeater to Anderson Ranch Powerplant was acceptable at 31 dB. The antenna at Anderson Ranch Dam and the antenna at Anderson Ranch TV Hill are listed on the RFA's as yagis. They are both corner reflectors. Mr. Bolin will correct these discrepancies and forward through channels.

7. The project's plans to change the UHF link at Anderson Ranch TV Hill to simplex use on 415.075 MHz are still pending the arrival of the necessary parts. Both authorizations are posted pending the changeover.

8. The project has purchased and is testing a multi-camera security system at Black Canyon Dam Control Center. The system takes video still pictures from 4 camera locations at Anderson Ranch Powerplant and transmits them (currently by telephone lines) to the Control Center. The system can be triggered by door alarms and will activate the phone line and transmit each camera location in turn to a viewing screen in the control center. The operator can then select normal, fast, or quad mode (whereby all four cameras are painted on one screen) and identify the problem. The cameras cost about \$1,000 each, the receiver/transmitter unit about \$5,000. The idle phone line cost is about \$35 per month, with extra charges when the line is actually in use. When automated operation of plants at Anderson, Minidoka, Palisades, and Deadwood is implemented in the 1990's, this should prove a useful addition to simple door alarms and eliminate unnecessary visits to the plants for false alarms.

GRAND COULEE PROJECT OFFICE

9. Lee Star, radio maintenance technician, conducted the team to the various sites. Communications electronics personnel are now operating and maintaining the Grand Coulee nighttime LASER light show. This may place an added burden on the C&I shop in completing regular required communications systems maintenance. This nightly program uses four laser beams of different colors to project a visual information presentation over 2,000 feet on to the

front of the dam. The system replaces a 30-year-old system with a state-of-the-art entertainment format including audio which educates and entertains visitors to the dam at lower cost. The \$758,000 cost for the system is expected to pay for itself in water and energy savings in just over three years.

10. The Denver Office had not received any Radio Equipment Maintenance Logs from the project for some time. Apparently, the maintenance has been performed. In most cases, it was simply that the reports had not been forwarded to the Denver Office. Mr. Star provided copies of the report for some transmitters and agreed to forward the remainder as required. In addition, the status of the Candy Point repeater had been changed. The team requested that the deactivation of the Candy Point Repeater transmitter on 170.05 MHz and receiver on 171.625 MHz be marked on the RFA (Radio Frequency Authorization) and submitted through Mr. Bolin to the Facilities Engineering Branch. One transmitter (122.925 MHz) (aircraft radio contact) had been incorrectly identified on the RFA as a fixed transmitter. It is in reality a portable. It was requested that this correction be also noted and submitted through Mr. Bolin. Mr. Gebhardt provided a copy of the explanations for each coded field on the RFA's as an aid to the project in preparing updated requests for frequency assignment. Since RI 254 will, in the future, require that the original of previous radio maintenance log forms (form 7-2200) be made available in a logbook at each site, we recommend that the project initiate this procedure at its convenience. Copies may, in addition, be kept in a project office notebook or other central location if desired.

11. Mr. Star inquired about the possibility of purchasing and installing tourist information radio transmitters on AM (amplitude modulation radio) for dispensing information about the project to visitors. Mr. Bolin recommended that the project submit a request for RFA in the normal manner through the regional office. The preferred frequency is 570 kHz.

12. Mr. Star informed us about a useful and inexpensive solution to a problem he had experienced with General Electric (G.E.) Master II radios. This solution may be useful if G.E. has not yet replaced your cavities with new ones free of charge. However, we understand that G.E. is now replacing the cavities at no cost to the user. Check with your local G.E. representative. Apparently the older models (ones with bright-finish front end cavities) were failing. This turned out to be the result of the plating finish flaking off on the inside of the cavity. This can be verified by examining just inside the caps, where "whiskers" of flaked off material will be evident. A gradual decrease in sensitivity can be temporarily reversed by using a standard aerosol air duster of the type used to blow dust off electronic components and blowing a blast of air inside the cavity through a hole. A more permanent fix is to disassemble the cavity and "seedblast" (less destructive than sandblasting) the flaked material from the metal of the cavity completely. The cavities can then be reassembled. Occasionally, the small ceramic pieces into which the cavity screws are secured may break. To avoid purchasing all new cavities, one new cavity will provide a sufficient number of ceramics to repair the few that do break. Please contact Lee Star at FTS 446-9304 or (509) 633-9304 commercial if you have any questions.

13. Fade margin tests were not performed at any of the Grand Coulee Sites. The Candy Point Repeater had been deactivated, as mentioned above, and pre-

amplifiers were scheduled to be added to the Monumental Mountain and Grand Coulee Powerplant transmitters.

14. A brief exit interview was presented to the Acting Project Manager, Mr. Willard Pearson, who thanked the team for its review.

COLUMBIA BASIN PROJECT

15. Ron Jeske, hydrologic technician, conducted a tour on the drive down from Grand Coulee to Ephrata. The Dry Falls Dam facility had a valid RFA, but no radio maintenance logbook. The West and East Low Canal Bifurcation did not have a valid transmitter RFA and did not have a logbook. The radios are owned and operated by the Bureau. The operator of the radios and owner of the license (radio frequency authorization) is responsible for the maintenance of the radios, although the actual maintenance is contracted out to Basin Electronics.

16. At the Ephrata Construction Office, RFA's for the radios were in place, but outdated. Logbooks contained Radio Equipment Maintenance Forms for the old radios. No maintenance data was available since May 14, 1987. At the Othello Soils Laboratory, the RFA was correct as posted, but the team was unable to find any logbook containing maintenance records. At the Othello Construction Office, the logbook also contained old maintenance forms which did not agree with the RFA, i.e.: transmit and receive frequencies were reversed. One transmit frequency had been disabled and was no longer in use.

17. Mr. Ron Jeske, accompanied by Mr. Ken Phillips, supervisor and Mr. Darrell Fuller, communications technician of the East Columbia Irrigation District, accompanied the team on a tour of the Wahatis Peak Repeater. At the repeater, Mr. Fuller performed the fade margin tests. The data were recorded by Mr. Gebhardt. The margins were acceptable. Reception from Dry Falls Dam was somewhat marginal but acceptable on the voice channel at 24 dB. The RFA's at Wahatis Peak were outdated, and the maintenance logbooks were also outdated.

18. After returning from Wahatis Peak Repeater, the team stopped at Basin Electronics, where Mr. Jeske was able to secure copies of the missing Radio Equipment Maintenance Log forms which had never reached the Ephrata Construction Office and had not been left at the transmitter sites. The contractor was asked to do this in the future, and Mr. Jeske said he would see that copies were forwarded to the Denver Office as required. The team requested that the RFA's for all Columbia Basin Project transmitters be corrected in red on copies of the RFA's and be submitted through Mr. Bolin to Mr. Gebhardt for correction to the Government Master File. Mr. Bolin agreed to provide, to the Ephrata Office, replacement copies of the updated RFA's for those stations which had outdated RFA's posted. The team then left by Bureau Plane for the return trip to Boise.

RECOMMENDATIONS

Central Snake Project Office:

R1. Correct RFA's for Anderson Ranch to indicate the actual type of antenna in use (Paragraph 6).

R2. Cancel any RFA's no longer required (Paragraphs 5 and 6).

Grand Coulee Project Office:

R3. Ensure Radio Equipment Maintenance Logs for all fixed transmitters are forwarded to the Denver Office, D-5210 in a timely manner (Paragraph 10).

R4. Correct RFA's to reflect current usage and submit to the regional office for forwarding to the Denver Office. This includes corrections for both the Candy Point Repeater on 170.05 MHz and the aircraft radio on 122.925 MHz. Cancel any RFA's no longer required (Paragraph 10).

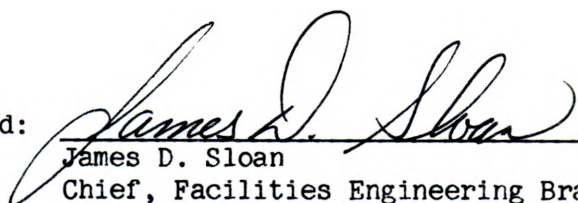
Columbia Basin Project Office:

R5. Review each fixed station RFA and compare with its transmitter, correcting each RFA to agree with the actual installation, and submitting revised or modified RFA's as necessary to eliminate discrepancies. Ensure that the correct, current RFA is posted at each transmitter. (A copy of the RFA, marked in red ink with the corrections, is perfectly suitable for submitting corrections or posting at the transmitter until a new, corrected original is received.) Cancel any RFA's no longer required (Paragraphs 15, 16, and 17).

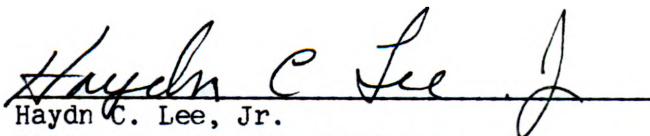
R6. Continue with periodic maintenance, but ensure that the contractor leaves the original Radio Equipment Maintenance Log report for all fixed base and repeater transmitters in the folder provided at the transmitter and sends the yellow copy to the project office for transmittal to the Denver Office, Facilities Engineering Branch, D-5210, as required by Reclamation Instructions 254 (Paragraphs 15, 16, 17, and 18).


Richard F. Gebhardt, Electronics Engineer

Concurred:


James D. Sloan
Chief, Facilities Engineering Branch

Approved:


Haydn C. Lee, Jr.
Chief, Engineering Division



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